

CLAIMS

What is claimed is:

- 1 1. A method for communicating an alarm in a computer network, comprising:
2 detecting an event associated with a device or any component thereof on the
3 computer network, wherein the device is associated with a particular site in a
4 plurality of sites;
5 in response to detecting the event, propagating an alarm to an alarm identification
6 component;
7 at the alarm identification component, augmenting the alarm with identification
8 information to result in creating an augmented alarm; and
9 transmitting the augmented alarm to a network operations center for the computer
10 network, wherein the network operations center processes alarms for each site
11 in the plurality of sites.
- 1 2. The method of Claim 1, wherein the identification information identifies the
2 particular site in the plurality of sites in which the alarm originated.
- 1 3. The method of Claim 1, wherein the identification information uniquely identifies the
2 device on the computer network.
- 1 4. The method of Claim 1, wherein the identification information comprises an address
2 for the device on the computer network.
- 1 5. The method of Claim 1, wherein the identification information comprises
2 geographical information associated with the particular site in which the alarm
3 originated.

- 1 6. The method of Claim 1, wherein the identification information comprises network
2 information associated with the particular site in which the alarm originated.
- 1 7. The method of Claim 1, wherein the alarm identification component is hosted by one
2 or more edge routers associated with the particular site.
- 1 8. The method of Claim 1, wherein each site in the plurality of sites is a local area
2 network, and wherein the alarm identification component is a router that
3 communicates with one or more edge routers, wherein each of the one or more edge
4 routers is associated with a different site in the plurality of sites.
- 1 9. The method of Claim 1, wherein the alarm identification component is in the device
2 that detected the event.
- 1 10. The method of Claim 1, wherein the step of augmenting the alarm with identification
2 information comprises:
3 conveying the identification information in a VarBind portion of a SNMP message
4 associated with the alarm.
- 1 11. The method of Claim 1, wherein the step of detecting the event comprises:
2 detecting a condition using a SNMP agent that is in the device.
- 1 12. The method of Claim 1, wherein the step of propagating the alarm is performed by
2 transmission of a SNMP message, a Syslog event, or a CNS bus event.
- 1 13. The method of Claim 1, further comprising the step of:
2 in response to detecting the event associated with the device, generating the alarm at
3 one member selected from the group consisting of: a switch, a router, an IP

4 phone, a call manager component, a voice mail component, and an event
5 monitoring component.

1 14. The method of Claim 1, further comprising the step of:
2 creating the identification information based on an address of the device on the
3 computer network.

1 15. The method of Claim 1, further comprising the step of:
2 creating the identification information based on an address of an edge router
3 associated with the particular site.

1 16. The method of Claim 1, further comprising the step of:
2 creating the identification information based on a table that maps device addresses to
3 identification information.

1 17. The method of Claim 1, further comprising the steps of:
2 performing a first determination of whether the identification information may be
3 created based on a table that maps device addresses to identification
4 information;
5 if the first determination is negative, then performing a second determination of
6 whether the identification information may be created based on an address of
7 an edge router associated with the particular site; and
8 if the second determination is negative, then creating the identification information
9 using a set of default identification information associated with the alarm
10 identification component.

- 1 18. The method of Claim 1, wherein the alarm identification component augments the
2 same identification information for each device in the particular site.
- 1 19. The method of Claim 1, wherein one or more of the plurality of sites uses network
2 address translation.
- 1 20. The method of Claim 1, wherein the device is a first device, wherein the first device
2 and a second device on the computer network both use network address translations,
3 wherein the second device is associated with a different site in a plurality of sites than
4 the first device, wherein the first device and the second device are associated with the
5 same IP address, and wherein the identification information uniquely identifies the
6 alarm associated with the first device.
- 1 21. The method of Claim 1, wherein the augmented alarm is in a plurality of augmented
2 alarms received at the network operations center, and further comprising:
3 creating a view comprising a subset of the plurality of augmented alarms received at
4 the network operations center by filtering the plurality of augmented alarms
5 using a set of criteria.
- 1 22. A computer-readable medium carrying one or more sequences of instructions for
2 communicating an alarm in a computer network, wherein execution of the one or
3 more sequences of instructions by one or more processors causes the one or more
4 processors to perform the steps of:
5 detecting an event associated with a device or any component thereof on the
6 computer network, wherein the device is associated with a particular site in a
7 plurality of sites;

8 in response to detecting the event, propagating an alarm to an alarm identification
9 component;
10 at the alarm identification component, augmenting the alarm with identification
11 information to result in creating an augmented alarm; and
12 transmitting the augmented alarm to a network operations center for the computer
13 network, wherein the network operations center processes alarms for each site
14 in the plurality of sites.

1 23. The computer-readable medium of Claim 22, wherein the identification information
2 identifies the particular site in the plurality of sites in which the alarm originated.

1 24. The computer-readable medium of Claim 22, wherein the identification information
2 uniquely identifies the device on the computer network.

1 25. The computer-readable medium of Claim 22, wherein the identification information
2 comprises an address for the device on the computer network.

1 26. The computer-readable medium of Claim 22, wherein the identification information
2 comprises geographical information associated with the particular site in which the
3 alarm originated.

1 27. The computer-readable medium of Claim 22, wherein the identification information
2 comprises network information associated with the particular site in which the alarm
3 originated.

1 28. The computer-readable medium of Claim 22, wherein the alarm identification
2 component is hosted by one or more edge routers associated with the particular site.

- 1 29. The computer-readable medium of Claim 22, wherein each site in the plurality of
2 sites is a local area network, and wherein the alarm identification component is a
3 router that communicates with one or more edge routers, wherein each of the one or
4 more edge routers is associated with a different site in the plurality of sites.
- 1 30. The computer-readable medium of Claim 22, wherein the alarm identification
2 component is in the device that detected the event.
- 1 31. The computer-readable medium of Claim 22, wherein the step of augmenting the
2 alarm with identification information comprises:
3 conveying the identification information in a VarBind portion of a SNMP message
4 associated with the alarm.
- 1 32. The computer-readable medium of Claim 22, wherein the step of detecting the event
2 comprises:
3 detecting a condition using a SNMP agent that is in the device.
- 1 33. The computer-readable medium of Claim 22, wherein the step of propagating the
2 alarm is performed by transmission of a SNMP message, a Syslog event, or a CNS
3 bus event.
- 1 34. The computer-readable medium of Claim 22, wherein execution of the one or more
2 sequences of instructions on each computer-readable medium by the one or more
3 processors causes the one or more processors to further perform the step of:
4 in response to detecting the event associated with the device, generating the alarm at
5 one member selected from the group consisting of: a switch, a router, an IP

6 phone, a call manager component, a voice mail component, and an event
7 monitoring component.

1 35. The computer-readable medium of Claim 22, wherein execution of the one or more
2 sequences of instructions on each computer-readable medium by the one or more
3 processors causes the one or more processors to further perform the step of:
4 creating the identification information based on an address of the device on the
5 computer network.

1 36. The computer-readable medium of Claim 22, wherein execution of the one or more
2 sequences of instructions on each computer-readable medium by the one or more
3 processors causes the one or more processors to further perform the step of:
4 creating the identification information based on an address of an edge router
5 associated with the particular site.

1 37. The computer-readable medium of Claim 22, wherein execution of the one or more
2 sequences of instructions on each computer-readable medium by the one or more
3 processors causes the one or more processors to further perform the step of:
4 creating the identification information based on a table that maps device addresses to
5 identification information.

1 38. The computer-readable medium of Claim 22, wherein execution of the one or more
2 sequences of instructions on each computer-readable medium by the one or more
3 processors causes the one or more processors to further perform the steps of:
4 performing a first determination of whether the identification information may be
5 created based on a table that maps device addresses to identification
6 information;

7 if the first determination is negative, then performing a second determination of
8 whether the identification information may be created based on an address of
9 an edge router associated with the particular site; and
10 if the second determination is negative, then creating the identification information
11 using a set of default identification information associated with the alarm
12 identification component.

1 39. The computer-readable medium of Claim 22, wherein the alarm identification
2 component augments the same identification information for each device in the
3 particular site.

1 40. The computer-readable medium of Claim 22, wherein one or more of the plurality of
2 sites uses network address translation.

1 41. The computer-readable medium of Claim 22, wherein the device is a first device,
2 wherein the first device and a second device on the computer network both use
3 network address translations, wherein the second device is associated with a different
4 site in a plurality of sites than the first device, wherein the first device and the second
5 device are associated with the same IP address, and wherein the identification
6 information uniquely identifies the alarm associated with the first device.

1 42. The computer-readable medium of Claim 22, wherein the augmented alarm is in a
2 plurality of augmented alarms received at the network operations center, and wherein
3 execution of the one or more sequences of instructions on each computer-readable
4 medium by the one or more processors causes the one or more processors to further
5 perform the step of:

6 creating a view comprising a subset of the plurality of augmented alarms received at
7 the network operations center by filtering the plurality of augmented alarms
8 using a set of criteria.

1 43. A system for communicating an alarm in a computer network, comprising:
2 means for detecting an event associated with a device or any component thereof on
3 the computer network, wherein the device is associated with a particular site
4 in a plurality of sites;
5 means for propagating an alarm to an alarm identification means in response to
6 detecting the event;
7 means for augmenting the alarm with identification information to result in creating
8 an augmented alarm; and
9 means for transmitting the augmented alarm to a network operations center for the
10 computer network, wherein the network operations center processes alarms
11 for each site in the plurality of sites.

1 44. The system of Claim 43, wherein the identification information identifies the
2 particular site in the plurality of sites in which the alarm originated.

1 45. The system of Claim 43, wherein the identification information uniquely identifies
2 the device on the computer network.

1 46. The system of Claim 43, wherein the identification information comprises an address
2 for the device on the computer network.

- 1 47. The system of Claim 43, wherein the identification information comprises
2 geographical information associated with the particular site in which the alarm
3 originated.
- 1 48. The system of Claim 43, wherein the identification information comprises network
2 information associated with the particular site in which the alarm originated.
- 1 49. The system of Claim 43, wherein the means for augmenting the alarm is hosted by
2 one or more edge routers associated with the particular site.
- 1 50. The system of Claim 43, wherein each site in the plurality of sites is a local area
2 network, and wherein the means for augmenting the alarm is a router that
3 communicates with one or more edge routers, wherein each of the one or more edge
4 routers is associated with a different site in the plurality of sites.
- 1 51. The system of Claim 43, wherein the means for augmenting the alarm is in the device
2 that detected the event.
- 1 52. The system of Claim 43, wherein the means for augmenting the alarm with
2 identification information comprises:
3 means for conveying the identification information in a VarBind portion of a SNMP
4 message associated with the alarm.
- 1 53. The system of Claim 43, wherein the means for detecting the event comprises:
2 means for detecting a condition using a SNMP agent that is in the device.
- 1 54. The system of Claim 43, wherein the means for propagating the alarm is performed
2 by a means for transmitting a SNMP message, a Syslog event, or a CNS bus event.

1 55. The system of Claim 43, further comprising:
2 means for generating the alarm, in response to detecting the event associated with the
3 device, at one member selected from the group consisting of: a switch, a
4 router, an IP phone, a call manager component, a voice mail component, and
5 an event monitoring component .

1 56. The system of Claim 43, further comprising:
2 means for creating the identification information based on an address of the device on
3 the computer network.

1 57. The system of Claim 43, further comprising:
2 means for creating the identification information based on an address of an edge
3 router associated with the particular site.

1 58. The system of Claim 43, further comprising:
2 means for creating the identification information based on a table that maps device
3 addresses to identification information.

1 59. The system of Claim 43, further comprising:
2 means for performing a first determination of whether the identification information
3 may be created based on a table that maps device addresses to identification
4 information;
5 means for performing a second determination of whether the identification
6 information may be created based on an address of an edge router associated
7 with the particular site if the first determination is negative; and

8 means for creating the identification information using a set of default identification
9 information associated with the alarm identification component if the second
10 determination is negative.

1 60. The system of Claim 43, wherein the means for augmenting the alarm augments the
2 same identification information for each device in the particular site.

1 61. The system of Claim 43, wherein one or more of the plurality of sites uses network
2 address translation.

1 62. The system of Claim 43, wherein the device is a first device, wherein the first device
2 and a second device on the computer network both use network address translations,
3 wherein the second device is associated with a different site in a plurality of sites than
4 the first device, wherein the first device and the second device are associated with the
5 same IP address, and wherein the identification information uniquely identifies the
6 alarm associated with the first device.

1 63. The system of Claim 43, wherein the augmented alarm is in a plurality of augmented
2 alarms received at the network operations center, and further comprising:
3 means for creating a view comprising a subset of the plurality of augmented alarms
4 received at the network operations center by filtering the plurality of
5 augmented alarms using a set of criteria.

1 64. A system for communicating an alarm in a computer network, comprising:
2 one or more processors; and
3 one or more computer-readable mediums that each carry one or more sequences of
4 instructions for communicating an alarm in a computer network, wherein

5 execution of the one or more sequences of instructions on each computer-
6 readable medium by the one or more processors causes the one or more
7 processors to perform the steps of:
8 detecting an event associated with a device or any component thereof on the
9 computer network, wherein the device is associated with a particular
10 site in a plurality of sites;
11 in response to detecting the event, propagating an alarm to an alarm
12 identification component;
13 at the alarm identification component, augmenting the alarm with
14 identification information to result in creating an augmented alarm;
15 and
16 transmitting the augmented alarm to a network operations center for the
17 computer network, wherein the network operations center processes
18 alarms for each site in the plurality of sites.

1 65. The system of Claim 64, wherein the identification information identifies the
2 particular site in the plurality of sites in which the alarm originated.

1 66. The system of Claim 64, wherein the identification information uniquely identifies
2 the device on the computer network.

1 67. The system of Claim 64, wherein the identification information comprises an address
2 for the device on the computer network.

1 68. The system of Claim 64, wherein the identification information comprises
2 geographical information associated with the particular site in which the alarm
3 originated.

- 1 69. The system of Claim 64, wherein the identification information comprises network
2 information associated with the particular site in which the alarm originated.
- 1 70. The system of Claim 64, wherein the alarm identification component is hosted by one
2 or more edge routers associated with the particular site.
- 1 71. The system of Claim 64, wherein each site in the plurality of sites is a local area
2 network, and wherein the alarm identification component is a router that
3 communicates with one or more edge routers, wherein each of the one or more edge
4 routers is associated with a different site in the plurality of sites.
- 1 72. The system of Claim 64, wherein the alarm identification component is in the device
2 that detected the event.
- 1 73. The system of Claim 64, wherein the step of augmenting the alarm with identification
2 information comprises:
3 conveying the identification information in a VarBind portion of a SNMP message
4 associated with the alarm.
- 1 74. The system of Claim 64, wherein the step of detecting the event comprises:
2 detecting a condition using a SNMP agent that is in the device.
- 1 75. The system of Claim 64, wherein the step of propagating the alarm is performed by
2 transmission of a SNMP message, a Syslog event, or a CNS bus event.
- 1 76. The system of Claim 64, wherein execution of the one or more sequences of
2 instructions on each computer-readable medium by the one or more processors causes
3 the one or more processors to further perform the step of:

4 in response to detecting the event associated with the device, generating the alarm at
5 one member selected from the group consisting of: a switch, a router, an IP
6 phone, a call manager component, a voice mail component, and an event
7 monitoring component.

1 77. The system of Claim 64, wherein execution of the one or more sequences of
2 instructions on each computer-readable medium by the one or more processors causes
3 the one or more processors to further perform the step of:
4 creating the identification information based on an address of the device on the
5 computer network.

1 78. The system of Claim 64, wherein execution of the one or more sequences of
2 instructions on each computer-readable medium by the one or more processors causes
3 the one or more processors to further perform the step of:
4 creating the identification information based on an address of an edge router
5 associated with the particular site.

1 79. The system of Claim 64, wherein execution of the one or more sequences of
2 instructions on each computer-readable medium by the one or more processors causes
3 the one or more processors to further perform the step of:
4 creating the identification information based on a table that maps device addresses to
5 identification information.

1 80. The system of Claim 64, wherein execution of the one or more sequences of
2 instructions on each computer-readable medium by the one or more processors causes
3 the one or more processors to further perform the steps of:

4 performing a first determination of whether the identification information may be
5 created based on a table that maps device addresses to identification
6 information;
7 if the first determination is negative, then performing a second determination of
8 whether the identification information may be created based on an address of
9 an edge router associated with the particular site; and
10 if the second determination is negative, then creating the identification information
11 using a set of default identification information associated with the alarm
12 identification component.

1 81. The system of Claim 64, wherein the alarm identification component augments the
2 same identification information for each device in the particular site.

1 82. The system of Claim 64, wherein one or more of the plurality of sites uses network
2 address translation.

1 83. The system of Claim 64, wherein the device is a first device, wherein the first device
2 and a second device on the computer network both use network address translations,
3 wherein the second device is associated with a different site in a plurality of sites than
4 the first device, wherein the first device and the second device are associated with the
5 same IP address, and wherein the identification information uniquely identifies the
6 alarm associated with the first device.

1 84. The system of Claim 64, wherein the augmented alarm is in a plurality of augmented
2 alarms received at the network operations center, and wherein execution of the one or
3 more sequences of instructions on each computer-readable medium by the one or
4 more processors causes the one or more processors to further perform the step of:

5 creating a view comprising a subset of the plurality of augmented alarms received at
6 the network operations center by filtering the plurality of augmented alarms
7 using a set of criteria.